

# System Reset Monolithic IC PST93XX Series

## Outline

These low reset type ICs function in a variety of CPU systems and other logic systems, to detect power supply voltage and reset the system accurately when power is turned on or interrupted.

They are ideal for use in battery check circuits for products using batteries, as they have ultra-low current consumption and a high precision voltage detection function.

## Features

- |                                                                                                                  |                                                     |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| 1. High precision voltage detection                                                                              | $V_S \pm 2\%$ max.                                  |
| 2. Ultra-low current consumption                                                                                 | $I_{CCH} = 2.0\mu A$ typ. $I_{CCL} = 2.0\mu A$ typ. |
| 3. Low operating limit voltage                                                                                   | 0.65V typ.                                          |
| 4. Hysteresis voltage provided in detection voltage                                                              | 50mV typ.                                           |
| 5. Output current high for ON                                                                                    | 5mA min.                                            |
| 6. Detection voltage can be selected as desired within a range of 1.9V ~ 4.6V in 0.1V steps, as indicated below. |                                                     |

PST93XX  
detection voltage value

(Example: for 4.2V ..... PST9342)

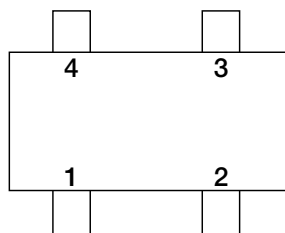
## Package

SC-82ABA (PST93XXU)

## Applications

1. Reset circuits in microcomputers, CPUs and MPUs.
2. Logic circuit reset circuits.
3. Battery voltage check circuits.
4. Back-up power supply switching circuits.
5. Level detection circuits.

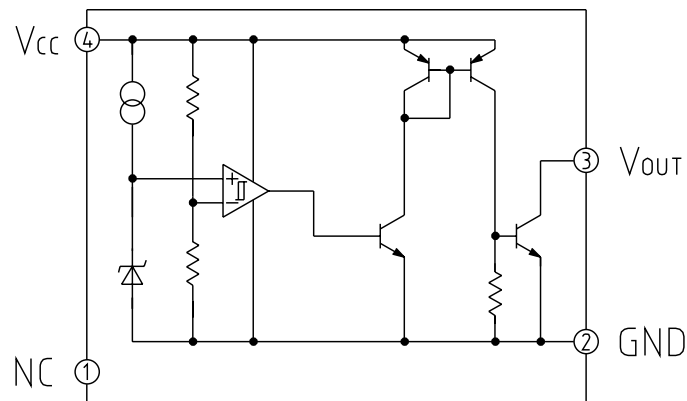
## Pin Assignment



SC-82ABA  
(TOP VIEW)

|   |           |
|---|-----------|
| 1 | NC        |
| 2 | GND       |
| 3 | $V_{OUT}$ |
| 4 | $V_{CC}$  |

Block Diagram



Pin Description

| Pin no. | Pin name         | Function                               |
|---------|------------------|----------------------------------------|
| 1       | NC               |                                        |
| 2       | GND              | GND pin                                |
| 3       | V <sub>OUT</sub> | Reset signal output pin                |
| 4       | V <sub>CC</sub>  | Power supply pin/voltage detection pin |

Absolute Maximum Ratings (T<sub>a</sub>=25°C)

| Item                  | Symbol               | Rating   | Units |
|-----------------------|----------------------|----------|-------|
| Storage temperature   | T <sub>STG</sub>     | -40~+125 | °C    |
| Operating temperature | T <sub>OPR</sub>     | -20~+75  | °C    |
| Power supply voltage  | V <sub>CC</sub> max. | -0.3~+10 | V     |
| Allowable loss        | P <sub>d</sub>       | 150      | mW    |

Recommended Operating Conditions

| Item                  | Symbol           | Rating    | Units |
|-----------------------|------------------|-----------|-------|
| Operating temperature | T <sub>OPR</sub> | -20~+75   | °C    |
| Power supply voltage  | V <sub>CC</sub>  | +0.85~+10 | V     |

**Electrical Characteristics** (Ta=25°C)

| Item                                      | Symbol           | Measurement circuit | Measurement conditions                                                 | Min.    | Typ.  | Max.  | Units |   |
|-------------------------------------------|------------------|---------------------|------------------------------------------------------------------------|---------|-------|-------|-------|---|
| Detection voltage                         | Vs               | 1                   | V <sub>CC</sub> =H→L<br>R <sub>L</sub> =4.7k<br>V <sub>OL</sub> ≤ 0.4V | PST9346 | 4.508 | 4.600 | 4.692 | V |
|                                           |                  |                     |                                                                        | PST9345 | 4.410 | 4.500 | 4.590 |   |
|                                           |                  |                     |                                                                        | PST9344 | 4.312 | 4.400 | 4.488 |   |
|                                           |                  |                     |                                                                        | PST9343 | 4.214 | 4.300 | 4.386 |   |
|                                           |                  |                     |                                                                        | PST9342 | 4.116 | 4.200 | 4.284 |   |
|                                           |                  |                     |                                                                        | PST9341 | 4.018 | 4.100 | 4.182 |   |
|                                           |                  |                     |                                                                        | PST9340 | 3.920 | 4.000 | 4.080 |   |
|                                           |                  |                     |                                                                        | PST9339 | 3.822 | 3.900 | 3.978 |   |
|                                           |                  |                     |                                                                        | PST9338 | 3.724 | 3.800 | 3.876 |   |
|                                           |                  |                     |                                                                        | PST9337 | 3.626 | 3.700 | 3.774 |   |
|                                           |                  |                     |                                                                        | PST9336 | 3.528 | 3.600 | 3.672 |   |
|                                           |                  |                     |                                                                        | PST9335 | 3.430 | 3.500 | 3.570 |   |
|                                           |                  |                     |                                                                        | PST9334 | 3.332 | 3.400 | 3.468 |   |
|                                           |                  |                     |                                                                        | PST9333 | 3.234 | 3.300 | 3.366 |   |
|                                           |                  |                     |                                                                        | PST9332 | 3.136 | 3.200 | 3.264 |   |
|                                           |                  |                     |                                                                        | PST9331 | 3.038 | 3.100 | 3.162 |   |
|                                           |                  |                     |                                                                        | PST9330 | 2.940 | 3.000 | 3.060 |   |
|                                           |                  |                     |                                                                        | PST9329 | 2.842 | 2.900 | 2.958 |   |
|                                           |                  |                     |                                                                        | PST9328 | 2.744 | 2.800 | 2.856 |   |
|                                           |                  |                     |                                                                        | PST9327 | 2.646 | 2.700 | 2.754 |   |
| PST9326                                   | 2.548            | 2.600               | 2.652                                                                  |         |       |       |       |   |
| PST9325                                   | 2.450            | 2.500               | 2.550                                                                  |         |       |       |       |   |
| PST9324                                   | 2.352            | 2.400               | 2.448                                                                  |         |       |       |       |   |
| PST9323                                   | 2.254            | 2.300               | 2.346                                                                  |         |       |       |       |   |
| PST9322                                   | 2.156            | 2.200               | 2.244                                                                  |         |       |       |       |   |
| PST9321                                   | 2.058            | 2.100               | 2.142                                                                  |         |       |       |       |   |
| PST9320                                   | 1.960            | 2.000               | 2.040                                                                  |         |       |       |       |   |
| PST9319                                   | 1.862            | 1.900               | 1.938                                                                  |         |       |       |       |   |
| Hysteresis voltage                        | ΔVs              | 1                   | V <sub>CC</sub> =L →H→L, R <sub>L</sub> =4.7k                          | 30      | 50    | 100   | mV    |   |
| Detection voltage temperature coefficient | Vs/ΔT            | 1                   | R <sub>L</sub> =4.7k, Ta=-20~+75°C                                     |         | ±0.01 |       | %/°C  |   |
| Low-level output voltage                  | V <sub>OL</sub>  | 1                   | V <sub>CC</sub> =Vs min.-0.05V, R <sub>L</sub> =4.7k                   |         | 0.1   | 0.4   | V     |   |
| Output leakage current                    | I <sub>OH</sub>  | 1                   | V <sub>CC</sub> =V <sub>O</sub> =10V                                   |         |       | ±0.1  | μA    |   |
| Circuit current while on                  | I <sub>CCL</sub> | 1                   | V <sub>CC</sub> =Vs min.-0.05V, R <sub>L</sub> =∞                      |         | 2.0   | 4.0   | μA    |   |
| Circuit current while off                 | I <sub>CCH</sub> | 1                   | V <sub>CC</sub> =Vs typ./0.85, R <sub>L</sub> =∞                       |         | 2.0   | 4.0   | μA    |   |
| "H"transport delay time                   | T <sub>PLH</sub> | 2                   | R <sub>L</sub> =4.7k, C <sub>L</sub> =100pF *1                         |         | 20    | 60    | μs    |   |
| "L"transport delay time                   | T <sub>PHL</sub> | 2                   | R <sub>L</sub> =4.7k, C <sub>L</sub> =100pF *2                         |         | 20    | 60    | μs    |   |
| Operation limit voltage                   | V <sub>OPL</sub> | 1                   | R <sub>L</sub> =4.7k, V <sub>OL</sub> ≤ 0.4V                           |         | 0.65  | 0.85  | V     |   |
| Output current while on 1                 | I <sub>OL1</sub> | 1                   | V <sub>CC</sub> =Vs min.-0.05V, V <sub>O</sub> =0.4V                   | 5       |       |       | mA    |   |
| Output current while on 2                 | I <sub>OL2</sub> | 1                   | V <sub>O</sub> =0.4V V <sub>CC</sub> =Vs min.-0.05V, Ta=-20~+75°C      | 3       |       |       | mA    |   |

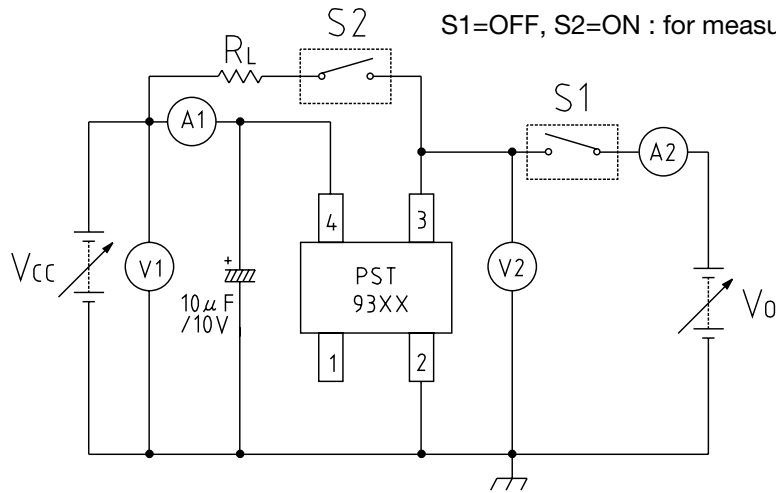
\*1 : t<sub>PLH</sub> : V<sub>CC</sub>= (Vs typ.-0.4v)→(Vs typ.+0.4v)

\*2 : t<sub>PHL</sub> : V<sub>CC</sub>= (Vs typ.+0.4v)→(Vs typ.-0.4v)

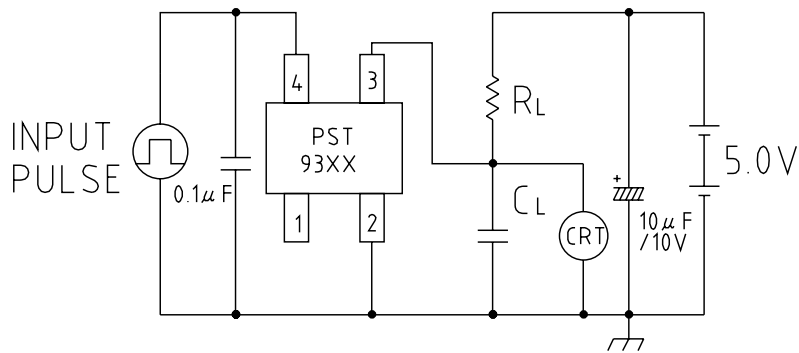
Measuring Circuit

(1)

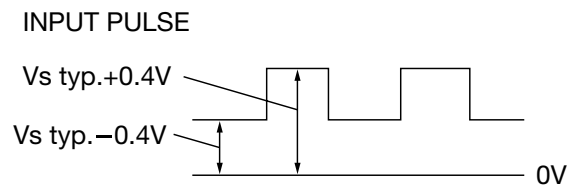
S1=ON, S2=OFF : when measuring  $I_{OH}$ ,  $I_{OL1}$ ,  $I_{OL2}$   
 S1=OFF, S2=ON : for measuring other than the above



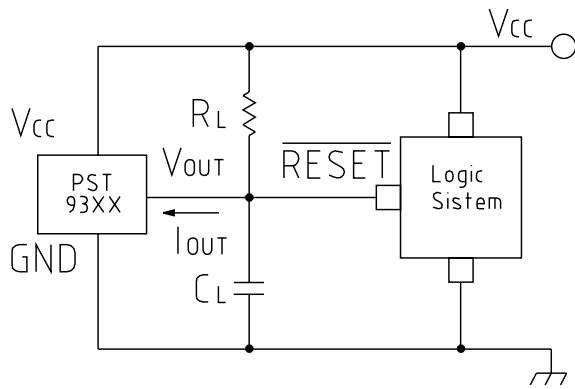
(2)



A : DC ammeter  
 V : DC voltmeter  
 CRT : Oscilloscope



Application circuits



[CL setting]

Several tens of mV of oscillation may appear in  $V_{OUT}$  when  $V_{CC}$  is near operating limit (approx. 0.7V)~1.0V, if  $R_L$  is set at more than  $R_L \approx 500k\Omega^*$  in the above application circuit. If this presents a problem, set the CL value slightly higher (1000pF or more recommended).

\*: Varies slightly depending on  $V_S$  rank.

Characteristics

